

A NEW SPECIES OF DIMORPHIC TREE FROG,
GENUS *HYLA* (AMPHIBIA: ANURA: HYLIDAE),
FROM THE VAUPÉS RIVER OF COLOMBIA

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Abstract.—*Hyla karenanneae* is a new species of small color-dimorphic tree frog from Amazonian Colombia. Males have a bilobed vocal sac and produce spermatozoa with a single tail filament.

Representatives of a new species of tree frog were collected at night from a small breeding chorus in lowland rainforest near the village of Timbó, Department of Vaupés, Colombia, in June 1973. The calls consisted of short, irregular, atonal notes emanating from frogs that were hidden among leaves over the water of a swamp. The frogs were conspicuous because of their sounds, but they were difficult to locate owing to the ventriloquistic quality of their voices. Attempts to record the calls on magnetic tape were unsuccessful. On subsequent visits to this locality, as well as visits to other similar habitats in the Vaupés, no other choruses of this frog were heard and no additional specimens were obtained.

Methodology note.—Measurements were made to the nearest 0.1 mm using Vernier calipers and a dissecting microscope. Slides of the testes were prepared following the method of Delahoussaye (1966).

Hyla karenanneae, new species
Fig. 1

Holotype.—The University of Texas at Arlington Collection of Vertebrates (UTA) A-3770, an adult female collected by J. K. Salser, Jr. and the author on 7 June 1973 near Timbó, Department of Vaupés, Colombia (01°06'N, 70°01'W, elev. 170 m).

Paratypes.—UTA A-3768 and UTA A-3769, both adult males, otherwise same data as holotype. The holotype was in am-

plexus with A-3769 on a leaf about one m above water at the time of capture.

Diagnostic characters (based on holotype and paratypes).—A small (Table 1), sexually dimorphic member of the genus *Hyla*. Female with white lateral stripe bordered below by pattern of black reticulations on white sides (Fig. 1); males with black reticulations on yellow sides. Female slightly larger than males and with blue-gray dorsum and blue ventral surfaces on limbs, hands, feet and digits. Males with yellow bilobed vocal sac, yellow-brown dorsum with irregular dark brown markings. Both sexes with prominently elevated nostrils and rounded snouts (Fig. 2); small axillary membranes; subarticular tubercles of fingers not divided, no orange or yellow spots on limbs, no subocular bars or spots; no thoracic glands. Male with no pollical spines or nuptial excrescences on fingers; spermatozoa with a single tail filament.

Description of type series.—A small member of the genus *Hyla* with flat snout, rounded in dorsal and lateral views, projecting slightly beyond lower jaw; nostrils prominently elevated in live frog; eyes large with transparent palpebrum; tympanum distinct, circular, its diameter about half length of eye opening; tympanic annulus present; a supratympanic fold impinging on dorsal rim of annulus.

Body slender, about as wide as head; skin of dorsum and lores smooth with scattered small warts, ventral skin granular; anal flap



Fig. 1. *Hyla karenanneae*, holotype, UTA A-3770.

small, not reaching midpoint of thigh; axillary membrane small, extending from side to a point about one third the distance along proximal part of upper arm; no calcar, no ulnar or tarsal fold; males with bilobed vocal sac, no pollical spines, no excrescences on fingers.

Fingers (Fig. 2) long, slender with basal webs and expanded terminal discs about equal in width to diameter of tympanum (Table 1); fingers with prominent, rounded, undivided, subarticular tubercles; thenar tubercle an elongate oval, palmar tubercle large, partially divided; relative length of fingers: $3 > 4 = 2 > 1$.

Legs long, slender, with heel overlap of about four mm when legs flexed and held at right angles to body axis; adpression of leg placing heel at about midpoint of eye; tarsal fold absent, exposed skin of shank with small warts like dorsum; dermal folds at knee and heel; metatarsal tubercles prominent, elliptical; subarticular tubercles elliptical to conical and undivided; webbing between first and second toes reduced (Fig. 2), about equaling that between third and fourth fingers. Extent of webbing between other toes varying from proximal end of antepenultimate phalanx of third toe to distal end of penultimate phalanx of fifth toe.

Vomerine teeth in two short, irregular rows very close to midline of upper jaw, between obliquely elliptical choanae; vocal

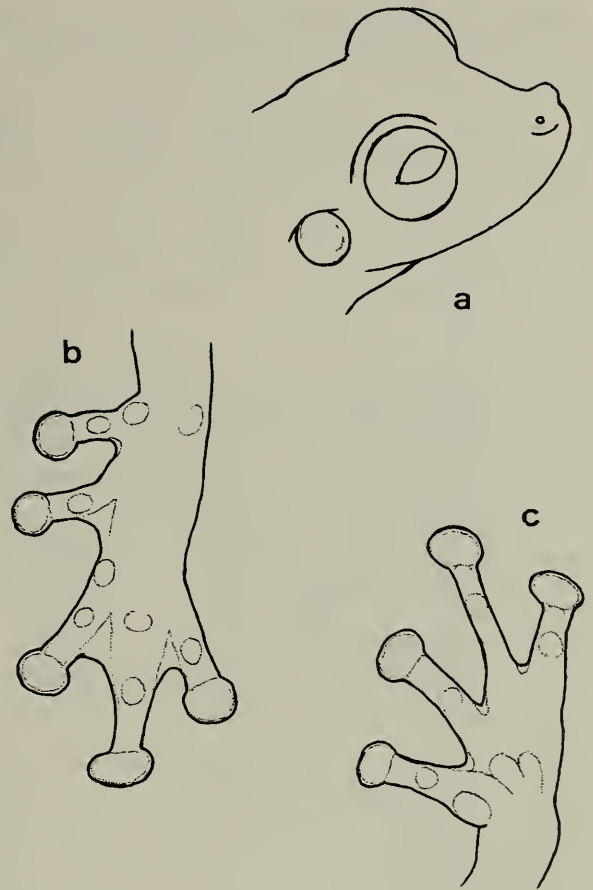


Fig. 2. *Hyla karenanneae*: (a) dorsolateral view of head showing rounded snout and prominent nares; (b) ventral view of foot; (c) ventral view of hand. Bar represents 1.5 mm.

slits of male beneath postero-lateral edge of tongue; female lacking vocal slits and vocal sac; tongue of preserved frogs round with posterior notch.

Color in life of males yellowish brown dorsally with dark brown spots and irregular dark brown markings forming mottled pattern over head and back; dark canthal stripe and dark postorbital line; no subocular bars or spots; sides yellow with black reticulations between axilla and groin; vocal sac yellow; outer surfaces of forearm and shank with three to four dark bars; venter pale yellowish cream and unmarked; lower surfaces of limbs, hands, feet and digits gray; bones green.

Color in life of female medium bluish gray dorsally, faintly mottled with dark gray; a cream white lateral stripe from above arm base to groin, bordered below by pattern of

Table 1.—Measurements in mm of the type series of *Hyla karenanneae*.

Catalog no.	Sex	SVL	Head length	Head width	Tibia length	Eye length	Tympanum diameter	Eye to nostril	Nostril to tympanum	Width third finger disc	Width fourth toe disc
UTA A-3768	♂	26.6	8.2	8.8	13.6	2.7	1.5	3.0	8.3	1.4	1.2
A-3769	♂	28.9	8.6	9.3	14.3	3.1	1.5	3.2	8.6	1.4	1.3
A-3770	♀	30.5	10.7	10.3	15.8	2.6	1.7	3.3	9.2	1.6	1.4

black reticulations on otherwise white sides; female (as in males) with dark canthal and postorbital line, dark bars on forearm and shank, no subocular bars or spots; gula and venter pearl white, unmarked; ventral surfaces of limbs, hands, feet and digits blue; no yellow pigmentation in color pattern.

Iris in both sexes bright golden bronze.

In preservative color of sexes similar; female with very little dorsal pigmentation, dorsum uniform pinkish gray; white lateral stripe indistinct; males without yellow color, pinkish gray with small brown spots over dorsum. Bars on limbs faintly visible in both sexes; lateral reticulations pale but visible. Males with brown canthal stripe and brown postorbital stripe.

Discussion

The single tail filament of the spermatozoa places this species in the genus *Hyla*, rather than in the genus *Scinax* (see Fouquette & Delahoussaye 1977, Pombal-Júnior & Gordo 1991, Duellman & Wiens 1992).

Hyla karenanneae does not readily fall into any of the presently recognized species groups of small Amazonian *Hyla*. It differs from all of these groups in dimorphic color pattern and vocal sac structure (see Diagnostic characters). *H. karenanneae* further differs from species in these groups as follows:

From the *Hyla parviceps* group of Duellman & Crump (1974), Heyer (1977, 1980), Duellman & Trueb (1989), it is distinguished by having a rounded, rather than bifid, subarticular tubercle on the fourth fin-

ger; a rounded, rather than blunt, snout; no pale subocular spots or bars; no orange or yellow spots on the legs. *Hyla karenanneae* differs from the *Hyla columbiana* species group of Duellman & Trueb (1983) in having a rounded snout and less extensive webbing between the fingers. From the *Hyla microcephala* group of Duellman & Fouquette (1968), *H. karenanneae* differs in having a rounded snout and in lacking uniformly yellow thighs. *Hyla karenanneae* differs from members of the *H. leucophyllata* species group of Cochran & Goin (1970) in having a pigmented thigh skin, in lacking red or orange coloration of the thigh and in lacking thoracic glands. From the *Hyla variabilis* species group of Cochran & Goin (1970), *H. karenanneae* differs in lacking a pink or red axillary membrane.

Other small Amazonian *Hyla*, of uncertain species group, differ from *H. karenanneae* as indicated in Table 2.

Acknowledgments

The species is named for my daughter, Karen Anne Pyburn, who has found an ancient Mayan city in Belize. Field work in Colombia was supported by the late W. Frank Blair and the International Biological Program. I am grateful to George Stewart for the preparation of slides that demonstrated sperm structure; to Wanda C. Pyburn and Jay K. Salser, Jr. for help with the field work; to Jonathan A. Campbell and Edmund D. Brodie, Jr. for work space, help in locating publications and general encouragement; to Belinda Zollotuchen for typing the manuscript and to Darrel R. Frost

Table 2.—Comparison of *Hyla karenanneae* with species of small Amazonian *Hyla* of uncertain species group. In so far as they are known, these species differ from *H. karenanneae* in lacking sexual dimorphism in color pattern and in having an undivided, subgular vocal sac. They also differ from *H. karenanneae* as indicated in the second column.

Name	Differs from <i>Hyla karenanneae</i> in having:	Author(s)
<i>Hyla rodriquezi</i>	a speckled throat; orange-red areas on thigh	Rivero (1968)
<i>H. grandisonae</i>	a gray venter, long legs (heel of adpressed leg almost to nares)	Goin (1966), Rivero (1968)
<i>H. rossalleni</i>	a pink thigh; no vomerine teeth	Goin (1957), Cochran & Goin (1970)
<i>H. minuta</i>	a white line above vent and on heel	Rivero (1961), Cochran & Goin (1970)
<i>H. aperomea</i>	small size (SVL of males = <22 mm); no axillary membrane; white supra-anal stripe	Duellman (1982)
<i>H. rhodopepla</i>	a white supra-anal stripe; reddish lateral stripe; white lip; blunt snout	Duellman (1972)
<i>H. leali</i>	a bifid subarticular tubercle on fourth finger; small size (SVL = 20–23 mm); very short snout	Bokermann (1964), Lutz (1973), Duellman (1982)
<i>H. minima</i>	a bifid subarticular tubercle on fourth finger, blunt snout	Duellman (1982)
<i>H. misera</i>	small size (SVL of males = 20 mm); distinct tarsal fold	Rivero (1961), Lutz (1973)
<i>H. riveroi</i>	small size (SVL of males = 18–20 mm); blunt snout; bifid subarticular tubercle on fourth finger	Cochran & Goin (1970), Duellman (1982)
<i>H. hiemalis</i>	an angular snout; tubercles on snout and heel	Haddid & Pombal-Júnior (1987)
<i>H. miniscula</i>	small size (SVL = 20 mm); blunt snout	Rivero (1971)
<i>H. berthaltulzae</i>	an X-shaped dorsal mark; small size (SVL of males = 18–21 mm); blunt snout	Bokermann (1962), Lutz (1973)
<i>H. bipunctata</i>	a pattern of pale spots on side of head; scarlet to orange concealed surfaces of limbs; blunt snout	Lutz (1973)
<i>H. branneri</i>	small size (SVL = 18 mm); very short, angular snout	Bokermann (1966)
<i>H. decipiens</i>	small size (SVL of males to 18 mm); males with nuptial excrescences on first finger	Lutz (1973)
<i>H. pinima</i>	black oval marks in three longitudinal series on dorsum; nostrils not elevated; head with vividly contrasting pattern	Bokermann & Sazima (1973)
<i>H. miyatae</i>	a bright red and yellow dorsum; small size (SVL of males = 16–18 mm); blunt snout; concealed tympanum	Vigle & Goberdham-Vigle (1990)

for permission to examine his unpublished manuscript dealing with hylid systematics.

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Literature Cited

- Bokermann, W. C. A. 1962. Cuatro nuevos hylidos del Brasil.—*Neotropica* 8:181–192.
- . 1964. Dos nuevas especies de *Hyla* de Rondônia, Brasil.—*Neotropica* 10:2–6.
- . 1966. Notas sobre Hylidae do Espírito Santo (Amphibia, Salientia).—*Revista Brasileira de Biologia* 26:29–37.
- , & Ivan Sazima. 1973. Anfíbios da serra do cipó, Minas Gerais, Brasil. 2: duas espécies novas de *Hyla* (Anura, Hylidae).—*Revista Brasileira de Biologia* 33:457–472.
- Cochran, D. M., & C. J. Goin. 1970. Frogs of Colombia.—*United States National Museum Bulletin* 288:1–655.
- Delahoussaye, A. J. 1966. The comparative sperm morphology of the Louisiana Hylidae (Amphibia: Anura).—*Proceedings of the Louisiana Academy of Sciences* 29:140–152.
- Duellman, W. E. 1972. The systematic status and life history of *Hyla rhodopepla* Günther.—*Herpetologica* 28:369–375.
- . 1982. A new species of small yellow *Hyla* from Perú (Anura: Hylidae).—*Amphibia Reptilia* 3:153–160.
- , & M. L. Crump. 1974. Speciation in frogs of the *Hyla parviceps* group in the upper Amazon Basin.—*University of Kansas Museum of Natural History, Occasional Papers* 23:1–40.
- , & M. J. Fouquette, Jr. 1968. Middle American frogs of the *Hyla microcephalia* group.—*University of Kansas Museum of Natural History Publications* 17:517–557.
- , & L. Trueb. 1983. Frogs of the *Hyla colombiana* group: taxonomy and phylogenetic relationships. Pp. 33–51 in A. G. J. Rhodin & K. Miyata, eds., *Advances in herpetology and evolutionary biology*. Museum of Comparative Zoology Harvard University, Cambridge.
- , & ———. 1989. Two new treefrogs of the *Hyla parviceps* group from the Amazon basin in southern Peru.—*Herpetologica* 45:1–10.
- , & J. J. Wiens. 1992. The status of the hylid frog genus *Ololygon* and recognition of *Scinax* Wagler, 1830.—*Occasional Papers of the Museum of Natural History, University of Kansas* (in press).
- Fouquette, M. J., Jr., & A. J. Delahoussaye. 1977. Sperm morphology in the *Hyla rubra* group (Amphibia, Anura, Hylidae) and its bearing on generic status.—*Journal of Herpetology* 11:387–396.
- Goin, C. J. 1957. Description of two new frogs from Colombia.—*Journal of the Washington Academy of Science* 47:60–63.
- . 1966. A new frog of the genus *Hyla* from British Guiana.—*Quarterly Journal of the Florida Academy of Science* 29:39–42.
- Haddid, C. F. B., & J. P. Pombal-Júnior. 1987. *Hyla hiemalis*, nova espécie do grupo *rizibilis* do estado de São Paulo (Amphibia, Anura, Hylidae).—*Revista Brasileira de Biologia* 47:127–132.
- Heyer, W. R. 1977. Taxonomic notes on frogs from the Madeira and Purus Rivers, Brasil.—*Papéis Avulsos de Zoologia* 31:141–162.
- . 1980. The calls and taxonomic positions of *Hyla giesleri* and *Ololygon opalina* (Amphibia: Anura: Hylidae).—*Proceedings of the Biological Society of Washington* 93:655–661.
- Lutz, B. 1973. Brazilian species of *Hyla*.—*University of Texas Press, Austin*, 260 pp.
- Pombal-Júnior, J. P., Jr., & M. Gordo. 1991. Duas novas espécies de *Hyla* da florista Atlântica no estado de São Paulo (Amphibia, Anura).—*Memórias do Instituto Butantan* 53:139–145.
- Rivero, J. A. 1961. Salientia of Venezuela.—*Bulletin of the Museum of Comparative Zoology* 126:1–207.
- . 1968. A new species of *Hyla* (Amphibia, Salientia) from Venezuelan Guayana.—*Breviora* 307:1–5.
- . 1971. Tres nuevos records y una nueva especie de anfibios de Venezuela.—*Caribbean Journal of Science* 11:1–9.
- Vigle, G. O., & D. C. I. Gopherdham-Vigle. 1990. A new species of small colorful *Hyla* from the lowland rainforest of Amazonian Ecuador.—*Herpetologica* 46:467–473.

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